

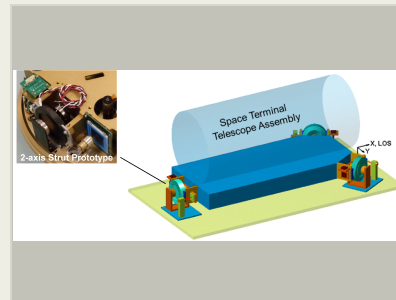
Isolation Platform for Long Range Optical Communications, Phase II

Completed Technology Project (2014 - 2018)



Project Introduction

Optical communication links provide higher data transfer rates with lower mass, power, and volume than conventional radio-frequency links. For deep space applications at long operational ranges, high performance stabilization of the space terminal data link is required. To meet this need, CDI has developed a novel application of our free-floating isolation platform. Based upon a Shuttle-proven technology, this approach yields 6-DOF isolation from the disturbances of the host vehicle while providing high-bandwidth active stabilization to attenuate both payload disturbances as well as any residual disturbances transferred from the base across the power/data umbilical. The proposed approach is designed to achieve better than 0.5microradian-rms stabilization for all frequencies above 0.1Hz when operating on a spacecraft. Phase I developed the design concept, demonstrated robustness through sensitivity studies, demonstrated performance through simulation, and establish the feasibility of the approach to meet the space terminal isolation requirements. Component testing of the sensors and actuators further demonstrated that the design will meet the performance requirements. These tests and analyses advanced the technology to TRL-4. Phase II continues the development by ground testing an end-to-end prototype on a soft suspension testbed to demonstrate overall performance in a simulated low-g operational environment. Both acquisition search and beacon track will be demonstrated. Iterations of development and environment testing are performed to produce several space qualified 2-axis strut assemblies for delivery to NASA. Three strut assemblies rigidly mounted to any space terminal will provide 6-DOF isolation and high-bandwidth stabilization. These struts are designed for robustness so they can be used as an add-on to any rigid structure, thus enabling a broad range of space applications that require high-precision stabilization, isolation, and pointing.



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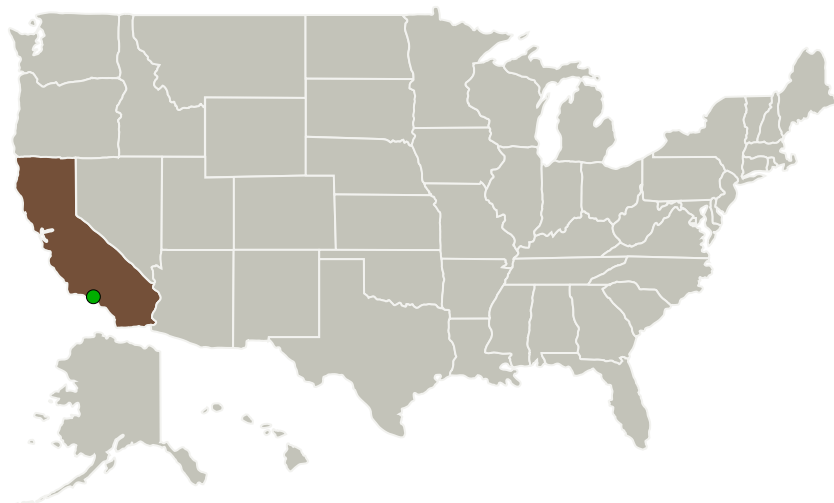
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Controlled Dynamics, Inc.	Lead Organization	Industry	Huntington Beach, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

▶ **April 2014:** Project Start

✓ **June 2018:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137452>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Controlled Dynamics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

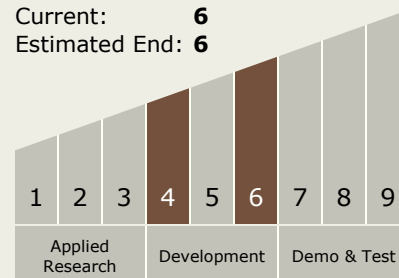
Carlos Torrez

Principal Investigator:

Scott Green

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6

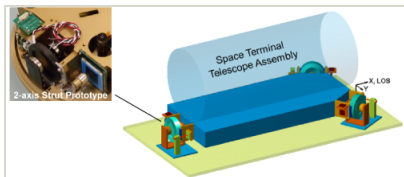


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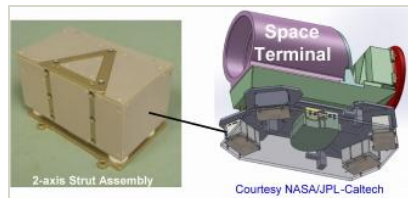


Images



Briefing Chart Image

Isolation Platform for Long Range Optical Communications, Phase II
(<https://techport.nasa.gov/image/129049>)



Final Summary Chart Image

Isolation Platform for Long Range Optical Communications, Phase II
Project Image
(<https://techport.nasa.gov/image/132886>)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.4 Pointing, Acquisition and Tracking (PAT)

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System